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SAN FRANCISCO

## San Francisco Planning Commission

### Environmental Impact Report

### STOW LAKE

### Chinese Pavilion and Huntington Falls

#### Draft

EE 76.167

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San Francisco Planning Commission

Environmental Impact Report

**STOW LAKE**  
**Chinese Pavilion and Huntington Falls**

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## I. SUMMARY

## I. SUMMARY

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The Recreation and Park Department of the City and County of San Francisco is proposing erection of a Chinese Pavilion and reconstruction of Huntington Falls on Strawberry Hill in Golden Gate Park. The proposed Pavilion would be erected on the shore of Stow Lake, and would be intended for aesthetic purposes. Reconstruction of Huntington Falls would restore the falls to their original function - again for aesthetic purposes.

Construction of the projects would cause short-term disruption to the immediate Stow Lake area. Operation of the Pavilion would involve maintenance and litter pick-up. Operation of Huntington Falls would require the commitment of energy for pumping the full flow of water for the falls. Visitor use of the Stow Lake area would likely increase with the implementation of either or both of these proposed projects.

Mitigation measures would include saving as many plants as possible, replacing lost plants and redesign of the Pavilion to avoid bright colors. Design of Huntington Falls circulation would be separated from the irrigation system to conserve energy and add flexibility to scheduling and operation of the falls.

The alternatives discussed include: no project; reconstruction only of Huntington Falls; erection only of the Pavilion; and phased as opposed to simultaneous projects.

## II. PROJECT DESCRIPTION

## II. PROJECT DESCRIPTION

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### A. INTRODUCTION

Two Stow Lake projects are proposed by the San Francisco Recreation and Park Department. They are: 1) erection of a Chinese Pavilion, donated by San Francisco's Sister City, Taipei, Taiwan, Republic of China, on the eastern edge of Strawberry Hill and 2) restoration of Huntington Falls, together with repairs and improvements for portions of the Golden Gate Park irrigation system in the Stow Lake / Strawberry Hill area.

These two component projects would be functionally separate and individually funded; construction, however, would occur nearly simultaneously and would affect the same, small, geographic area of Stow Lake. Accordingly, the San Francisco Office of Environmental Review has determined, due to the proximity of the projects, that a joint environmental impact report is necessary to evaluate the cumulative as well as the individual environmental effects of these two projects.



## II. PROJECT DESCRIPTION

### B. LOCATION

The sites of the projects are on the eastern portion of Strawberry Hill, an island in man-made Stow Lake, in Golden Gate Park, in the City and County of San Francisco. Figure 1 shows the area location of the sites and Figure 2, p. 5, shows their locations on Strawberry Hill.

### C. CHINESE PAVILION

#### BACKGROUND AND HISTORY

In April 1975, Mayor Chang Feng-shu of Taipei visited San Francisco and was impressed by Golden Gate Park, especially the Japanese Garden. Mayor Feng-shu stated that the City of Taipei would like to donate a Chinese Pavilion for the Park as a Bicentennial gift to the City of San Francisco; a condition of the gift was that the Pavilion be placed in Golden Gate Park. The Pavilion would be an open, octagonal structure to be used as a place for resting and contemplation. The San Francisco-Taipei Sister Cities Committee was designated to carry out the arrangements.

In Phase I, a tentative site was selected for the Pavilion by a committee of the Recreation and Park Commission and the staffs of the Departments of Public Works and Recreation and Park. The site proposed was the base of Strawberry Hill at the edge of Stow Lake (see Figure 3, p. 6). The Recreation and Park Commission on September 16, 1976 approved the Strawberry Hill site and accepted the gift of the Pavilion (Recreation and Park Commission Resolution No. 10467). The San Francisco Art Commission gave Phase II approval to the Pavilion in June of 1976, specifying that the color of the glazed roof tile, originally yellow, be grey-green to blend with the environment. Also, final approval by the San Francisco Art Commission of actual roof tile and flooring samples would be required. Following environmental analysis, a Negative Declaration for the combined Chinese Pavilion-Huntington Falls projects was granted by the San Francisco Department of City Planning on 8 October 1976,



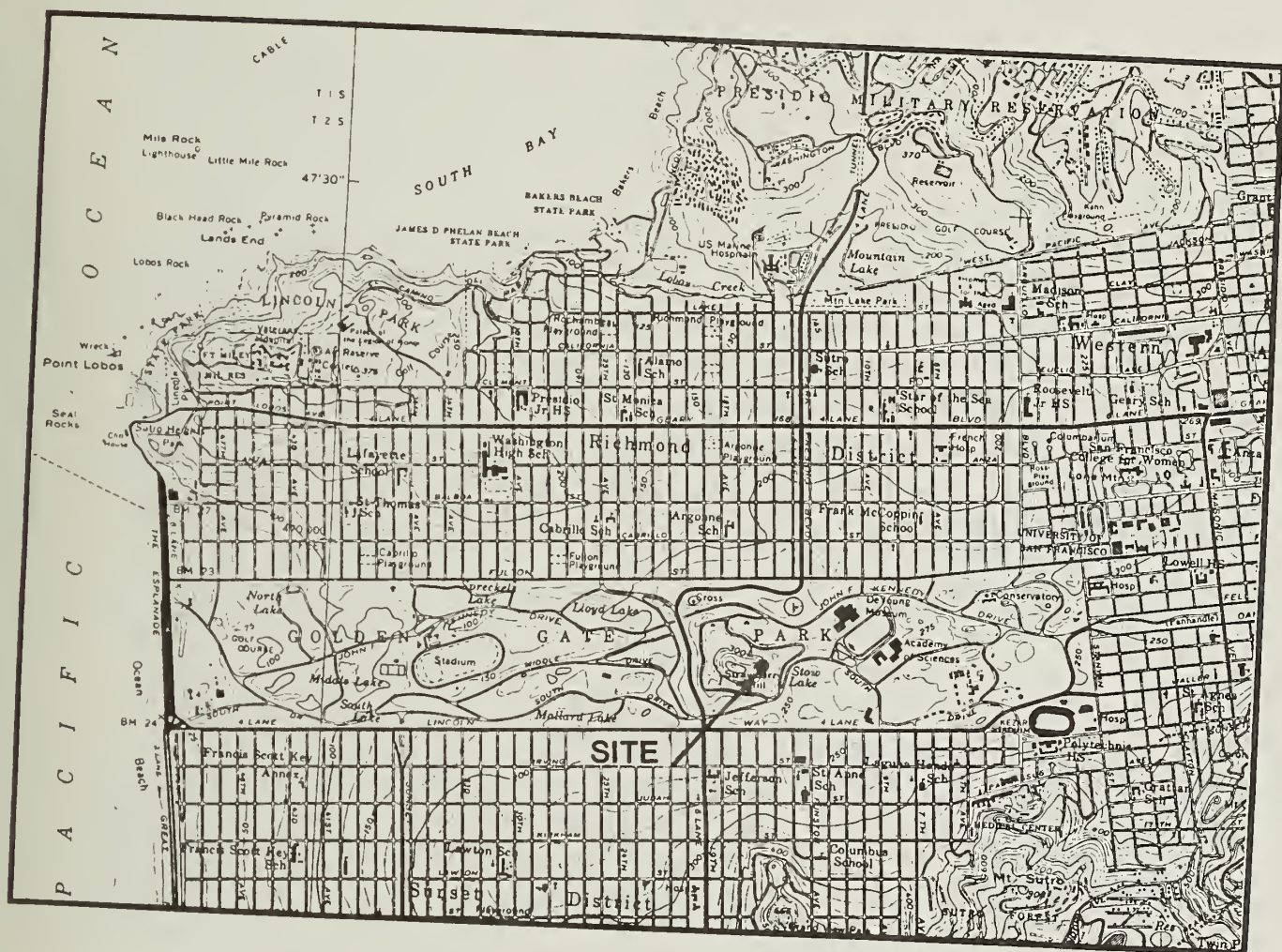


FIGURE 1 PROJECT LOCATION

Source-USGS 7.5 Minute Series,  
San Francisco North, Calif. Quad.

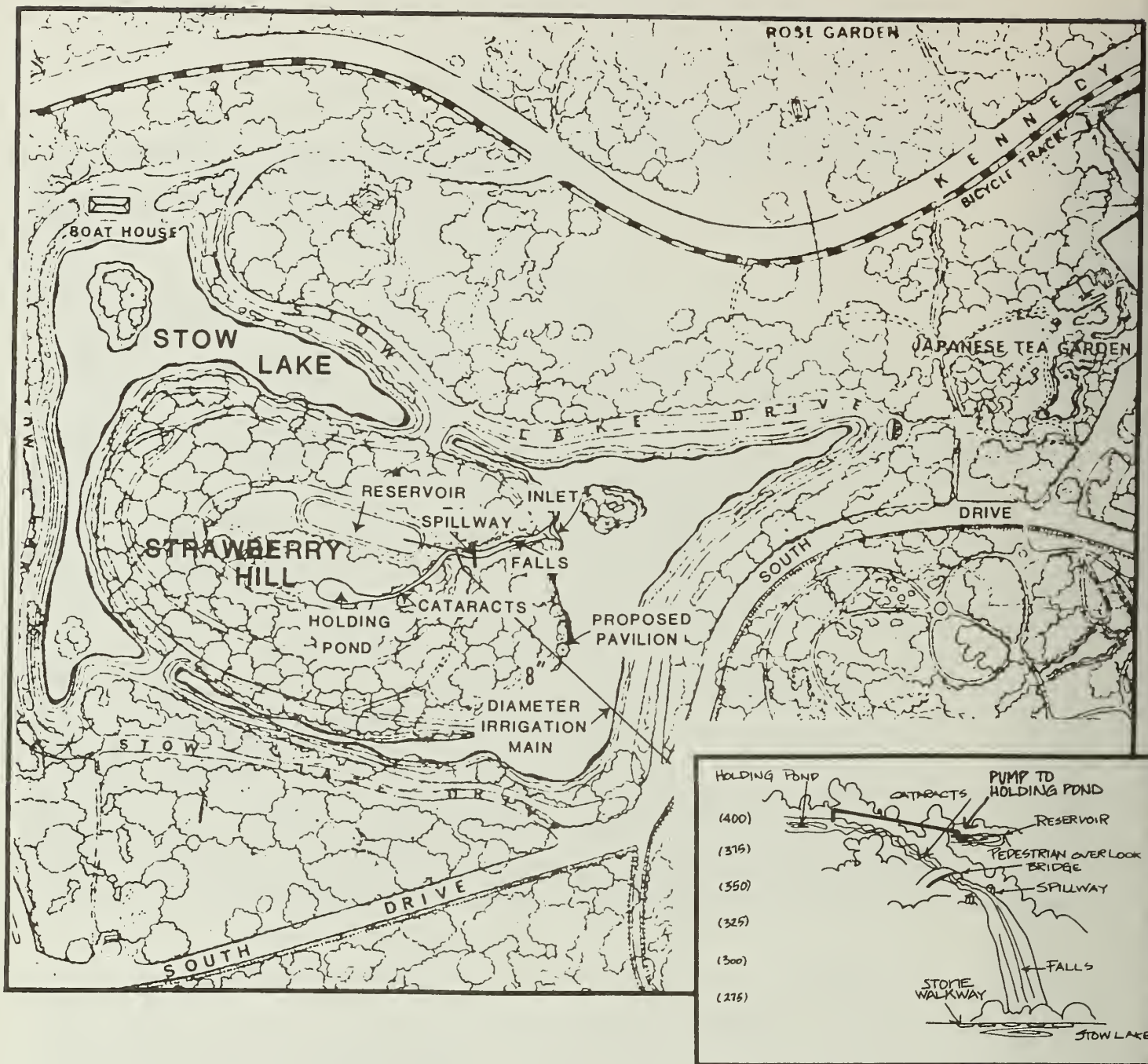


FIGURE 2 SITE PLAN



## II. PROJECT DESCRIPTION

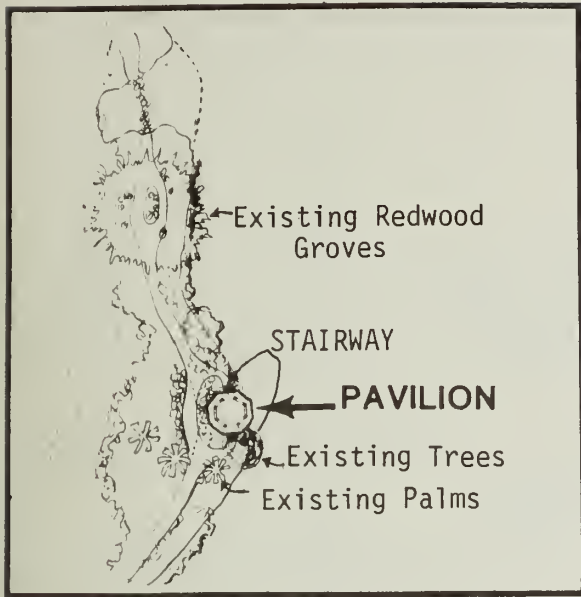


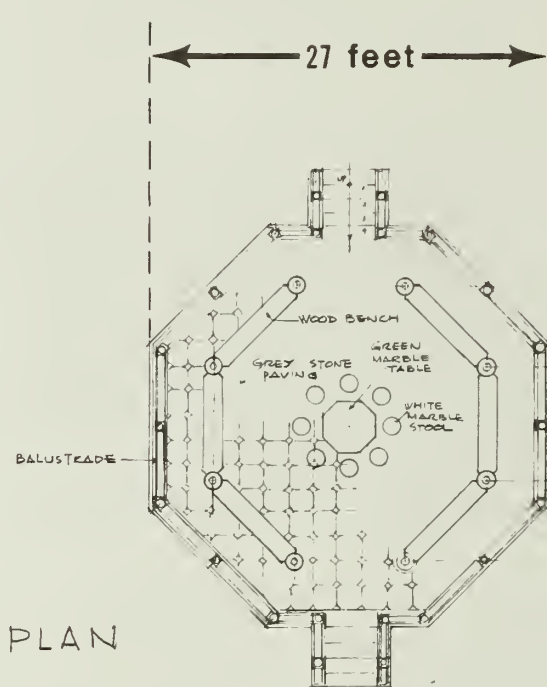
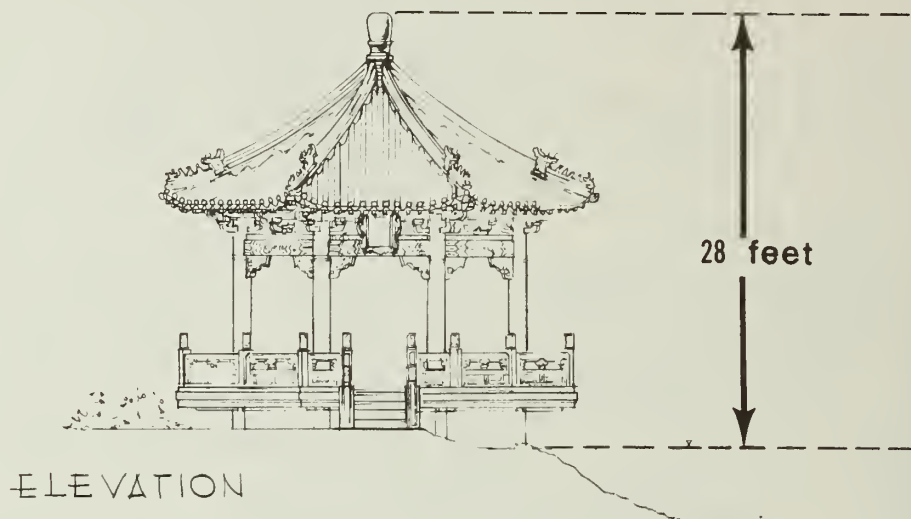
FIGURE 3 CHINESE  
PAVILION  
SITE

and acceptance and construction of the Pavilion was recommended by the Finance Committee of the Board of Supervisors on 27 September 1976 (File #38-76-44.1 and #493-76). The Negative Declaration, however, was appealed before the City Planning Commission by several citizens and the Commission ruled on 9 November 1976 that an environmental impact report would be required (Resolution No. 7603). The projects were transferred to the Health and Environment Committee, and subsequently, to the Planning, Housing and Development Committee of the San Francisco Board of Supervisors.

### LOCATION AND DESCRIPTION

The Pavilion would be situated at the water's edge on the eastern side of Strawberry Hill approximately 150 feet south of the center of the existing redwood grove and immediately north and east of three mature palm trees. The Pavilion would be approached by the existing unpaved pathway which circles the Hill. Access to the island is provided by one bridge on the north and one bridge on the south side of the Hill. These bridges are links to a paved path and to Stow Lake Drive, both of which encircle the Lake. Signs directing visitors to Stow Lake would be changed to include the Pavilion.

The Pavilion would be octagonal in shape and would measure 27 feet across and 28 feet high (see Figure 4). Stairways on the northerly and southerly sides would provide access from a short extension of the existing dirt pathway. The glazed tile roof would be grey-green and the concrete columns red. The interior would be open, containing a central marble table and stools, with wooden benches around the perimeter. No lighting, restrooms, drinking fountains or concessions are proposed. The Pavilion has been built in Taipei and is ready for shipment. The concrete foundation and columns



0 5 10 15'

FIGURE 4 CHINESE PAVILION  
ELEVATION AND FLOOR PLAN

## II. PROJECT DESCRIPTION

would be built on the site. Some vegetation would be removed from the water's edge, and the palm trees would remain undisturbed. The landscaping plan has not yet been prepared, but landscaping is not expected to be extensive.

### SCHEDULING

The construction period is estimated to be six months: one month would be required for site preparation, four months for erection of the structure, and one month for landscaping, exterior finishing and path restoration.

### PROJECT APPROVALS AND FUNDING

The cost of fabricating the Pavilion and of erecting it in the Park, approximately \$120,000, would be paid by the City of Taipei. Expense to the City of San Francisco Recreation and Park Department would include staff review and administrative time and landscaping. Maintenance costs would be estimated at \$500 to \$1,000 per year and would consist entirely of repainting the structure and possible vandalism repair. No additional services would be necessary, except for litter pickup which would be accommodated by an extension of existing services.

Following review and certification of the Environmental Impact Report by the City Planning Commission, other approvals, including Board of Supervisors' approval, are required before the project could be constructed. Phase III approval of actual samples of the roof tile color, floor tile design, and final building plans for the Pavilion must be granted by the San Francisco Art Commission. Approval must be given by two-thirds vote of the Board of Supervisors under a Charter provision (Section 7.403B) requiring Board approval for any structure in Golden Gate Park.

## II. PROJECT DESCRIPTION

### D. RESTORATION OF HUNTINGTON FALLS AND REHABILITATION OF THE IRRIGATION SYSTEM

#### BACKGROUND AND HISTORY

The Strawberry Hill Reservoir (referred to as the Reservoir), built in 1883, was one of the earliest components of the Golden Gate Park irrigation system. From its elevation of 361 feet (S.F. datum used throughout report unless otherwise noted) near the top of Strawberry Hill, it remains the only water impoundment located high enough to supply water pressure (hydraulic head) for irrigation of the northeastern section of the Park. Also, it is the main reservoir for the entire east Park. Originally clay-lined, the Reservoir is now concrete-lined and receives and stores both water pumped from the Arboretum Waterworks wells and reclaimed wastewater pumped from the McQueen Activated Sludge Sewage Treatment Plant near Elk Glen Lake. Water stored in the Reservoir would be pumped to the holding pond as the source of water for the restored Huntington Falls. The eight-inch diameter irrigation pipe proposed for replacement was built in the 1890's and carries water from the Reservoir to Middle Drive to irrigate the east Park; the pipe is believed to be in poor condition due to corrosion from age.

Stow Lake (referred to as the Lake), a clay-lined irrigation reservoir surrounding Strawberry Hill, was completed in 1893 by William Walter Stow, then Park Commissioner. The Lake is an integral part of the Park irrigation system; it is the main reservoir for irrigation of the western portion of Golden Gate Park. When water is not being pumped into Strawberry Hill Reservoir from the McQueen Plant, a check valve opens and water from Stow Lake is released to flow to the Chain of Lakes and the west Park, providing irrigation water to those areas.

Huntington Falls, named for railroad magnate Collis P. Huntington who donated \$25,000 for its construction, was built in 1893. The Falls began from a holding pond at the summit of the Hill. Water pumped to the holding pond ran down a watercourse, called "the cataracts," to the upper falls, near the Reservoir; the water then flowed under a pedestrian bridge, over the lower falls, and down a rocky spillway on the east side of Strawberry Hill into an inlet in Stow Lake.



## II. PROJECT DESCRIPTION

Although the Reservoir and Falls survived the 1906 and 1956 earthquakes, the water from a break in a pipe near the reservoir washed away the supporting earth in 1962 and the concrete and stonework of the Falls collapsed. The eastern end of the Strawberry Hill Reservoir was also overlooking the Falls. The landslide destroyed the spillway, filled the inlet with sand, and spread sand into Stow Lake. At that time, repairs were made to the Reservoir and 60 feet of the iron pipe main, but not to the Falls.

### LOCATION AND DESCRIPTION

The Huntington Falls restoration and irrigation system installation would involve the existing site of the Falls, but would also involve most of Strawberry Hill and a portion of Stow Lake.

The project would consist of several stages:

1. to replace the existing eight-inch irrigation main, which connects the Strawberry Hill Reservoir on a southeast alignment under Stow Lake to the Middle Drive irrigation system; and to rehabilitate the 750,000 gallon Reservoir, its piping and valves;
2. to clean Stow Lake in the vicinity of Huntington Falls to remove the estimated 3,000 cubic yards of sand which washed into the Lake at the time of the Falls' collapse. This would include dredging the inlet at the foot of the Falls and stabilizing the eastern shore of Strawberry Hill;
3. to restore the upper and lower Huntington Falls, including the holding pond at the summit of Strawberry Hill, the cataracts, and the Falls to the Lake inlet. The design intent would be to restore the Falls to their original condition as far as is practical; and
4. to build a local irrigation system for Strawberry Hill and to landscape the Hill, especially in the vicinity of the Falls.

The first stage would consist of replacement of approximately 800 linear feet of the existing, original main with eight-inch diameter iron pipe at about two and one-half feet below ground level. Since part of the piping extends beneath clay-lined Stow Lake, a portion of the Lake would have to be drained to expose the Lake bottom; coffer dams (temporary panels forming a channel)



## II. PROJECT DESCRIPTION

would be used to isolate the work area so that only an approximately 20-foot-wide segment of the eastern quarter of the lake would be drained. Approximately 200 cubic yards of earth, excavated for the pipe replacement, would be stored next to the trench and then be replaced over the new piping. Rehabilitation of the Reservoir would include cleaning and might include relining with a thin layer of asphalt, rubber, or gunite over mesh, if necessary. Valves and piping at the Reservoir would be renewed as necessary; no excavation would be required.

The second stage of the work would be to remove an estimated 3,000 cubic yards of earth material from the Lake at the base of the Falls; most of this would be used as fill for the Fall and the rest would be trucked to Fleischhacker Zoo. The stone pathway across the inlet would be restored. Soil stabilization, on the eastern side of the Hill only, would restore and reinforce the shoreline around Strawberry Hill which has eroded. This work could be done concurrently with stage one.

The restoration of Huntington Falls, the third stage, would require embankment of from 2,000 to 3,000 cubic yards of earth material taken from the inlet dredging. The pedestrian bridge at the upper falls would be replaced and sections of piping restored. Huntington Falls would then again serve as the surface overflow device for Strawberry Hill Reservoir; this would allow removal of the unnecessary overflow pipe and wire which were installed for that purpose on the north side of the Hill. No daily schedule for the operation of the Falls has yet been determined. The Recreation and Park Department estimates that the Falls will run 40 hours per week.

The fourth stage of the work would be the installation of a local irrigation system for Strawberry Hill and landscaping of the Hill, particularly in the vicinity of the Falls. This work would be completed only if funds remain after the accomplishment of the first three stages. No detailed plans for the irrigation system or the landscaping have been developed.

The construction period for the pipeline replacement would be from six to seven months. This would be done during the wet winter months when irrigation needs in the Park are lowest, because part of Stow Lake would be closed during

## II. PROJECT DESCRIPTION

the construction period. Rehabilitation of the Reservoir would take three months and would proceed concurrently. The Falls' restoration would require eight to nine months and would be done after all repairs to the eight-inch irrigation pipe have been completed. Portions of Strawberry Hill would be closed to the public and warning signs would be posted during the construction period for public safety. The existing footpath would have to be widened to as much as 20 feet to permit the passage of equipment; damage would be repaired at the end of the construction activity.

### PROJECT APPROVALS AND FUNDING

The 1974 State Beach Park, Recreational, and Historical Facilities Bond Act (a State Ballot Measure) allotted \$665,000 for the Stow Lake, Strawberry Hill and Huntington Falls restoration project. The cost of the reconstruction of the Falls, building the pedestrian overlook bridge, dredging the sand from the Lake, and reinforcing the shoreline is estimated at \$550,000. Replacement of the cast-iron pipe is estimated at \$90,000. The remaining \$25,000 of the grant would be used for rehabilitation of the reservoir, installation of a local irrigation system and landscaping the area. The funds became available to the City from the State 30 June 1976 to be used prior to 30 June 1979.

In addition to review and certification of the Environmental Impact Report by the Planning Commission, approval by the San Francisco Art Commission of any furniture, such as benches, would be required. After acceptance of a certified Final EIR, the State Department of Parks and Recreation would have to approve all plans before construction. Permits would have to be obtained from the Bureau of Building Inspection for any grading, plumbing, or electrical work. The final plans and the awarding of the contract would require the approval of the San Francisco Recreation and Park Commission.

### III. ENVIRONMENTAL SETTING

### III. ENVIRONMENTAL SETTING

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#### A. LAND USE

The project area is located on Strawberry Hill within Golden Gate Park, the largest public park in the City and County of San Francisco. Surrounded by predominantly residential development, the 1,000-acre Park is bordered by Stanyan St. on the east, Fulton St. on the north, Lincoln Way on the south and the Pacific Ocean to the west.

Most of the development in the Park is located in the 400 acres east of Strawberry Hill, while the 600 acres to the west are more open. The development includes such cultural and historical institutions as the de Young and Asian Art Museums, the California Academy of Sciences, the Conservatory, the Music Concourse, and McLaren Lodge, as well as the Arboretum and several gardens.

To the north of Strawberry Hill on the edge of Stow Lake is the Boat House, from which boats may be rented by the public for recreational use on the Lake. Also near the project area are the Pioneer Log Cabin to the north and a playground to the southwest. Immediately east of Stow Lake across Stow Lake Dr. are the landscaped Japanese Gardens and Tea House which receive heavy visitor use. To the south across South Dr. is Strybing Arboretum. To the east are the Music Concourse, the de Young Museum, the Asian Art Museum, and the California Academy of Science. These recreational attractions are all

### III. ENVIRONMENTAL SETTING

served by Tea Garden Dr. which is travelled by between 8,000 and 15,000 vehicles daily (except Sunday when it is closed for pedestrians). South Dr. is travelled by approximately 10,000 vehicles daily while John F. Kennedy Dr. is travelled by 19,000 vehicles east of Tea Garden Dr. and 8,000 vehicles west of Tea Garden Dr./1/ Pedestrian counts are not available for this entire area, however, walking, skating, and bicycling are popular here. Visitation at the Japanese Tea Gardens is between 5,000 and 20,000 people daily, being higher on weekends and during the summer./2/

At 375 ft. Strawberry Hill has the highest elevation in Golden Gate Park. Access to the Hill, which is an island in Stow Lake, is provided by two bridges. A pedestrian footpath encircles the Hill and goes up to the Reservoir; a service road goes from the northerly bridge to the Reservoir and on to the summit of the Hill. The Sweeney Observatory was located at the top of the Hill until it was destroyed in the earthquake of 1906. Also on the summit are the holding pond and the cataracts both of which are no longer in use. There is no picnic area, but benches are placed along the paved pedestrian walkway which circles the perimeter of the Lake; access to the area is provided by Stow Lake Dr.

The area is vital to the irrigation system of the Park. Strawberry Hill Reservoir, supplied by the Arboretum wells and the water reclamation plant, furnishes irrigation water for the eastern end of the Park and is the sole source of water for the northeastern sections. An eight-inch diameter main connects the Reservoir with the Middle Dr. irrigation systems to the southeast. Stow Lake, a clay-lined reservoir holding 15 million gallons, was built in 1892; it receives water from the same sources as does the Reservoir, as well as the Reservoir overflow, and is the main impoundment for irrigation water for the western end of the Park.

#### VISITOR USE

No data are available on the visitor use of Golden Gate Park or the Stow Lake area. The Hill is used by joggers, equestrians, and walkers. Pedestrian activity is concentrated on the perimeter of the Lake, with people (especially senior citizens) walking, sitting on benches, and feeding the waterfowl. The



### III. ENVIRONMENTAL SETTING

proximity of the Japanese Garden adds to the number of pedestrians at the Lake. Use is heaviest on weekends and in the afternoons during warm weather.

#### FOOTNOTES - Land Use

/1/ Harvey Quan, S.F. Traffic Department, telephone communication, 27 March 1978.

/2/ Memorandum, E.J. Shuster, 19 August 1977.

#### B. VISUAL AND AESTHETICS

Strawberry Hill offers views of Twin Peaks, the Presidio and the downtown skyline. There are areas on the hillside of exposed soil. The Hill is forested predominantly with evergreen trees; it is surrounded by man-made Stow Lake. The perimeter of the Lake is planted with occasional trees and shrubs near the water. Rather than being situated in a valley as are most lakes, Stow Lake is at a raised elevation of 267 ft. and lower lands may be viewed in the distance through the trees around Stow Lake Dr.

Low-powered electric motorboats and row boats are used to circumnavigate Strawberry Hill. The movement of these boats around the narrow Lake provides the appearance of a river setting.

The Japanese Garden and de Young and Asian Art museums, located approximately 500 and 800 ft., respectively, from the northeastern tip of the Lake, are not visible. Buildings which can be seen from Stow Lake Dr. are the Boat House at the northernmost edge of the Lake and a free-standing public restroom across South Drive; no buildings can be seen from the site of the proposed Pavilion. The site, northeast of a group of three mature palms, is thickly planted with elm and willow trees, shrubs, vinca and iris. The evergreen trees on the hill form a backdrop to the site.

At the summit of the Hill is the empty, stonework holding pond. Pine needles cover the unused watercourse of the cataracts. Little remains to mark the site of the Sweeney Observatory which was destroyed in the 1906 earthquake.

### III. ENVIRONMENTAL SETTING

The Strawberry Hill Reservoir is concrete-lined and surrounded by cyclone fencing. It is visible from the service road which borders it on the north and east. Neither the reservoir nor the holding pond can be seen from the perimeter of the Lake.

The elevation of Strawberry Hill permits the stonework ruins of the Huntington Falls spillway to be clearly observed from the eastern perimeter of the Lake. The former watercourse has been covered by sand and the area is barren and eroded. The stone footpath and inlet which existed at the base of the Falls were obscured by sand when the Falls collapsed.

#### C. GEOLOGY, SOILS AND SEISMICITY

Strawberry Hill, part of a northwesterly traverse ridge bisecting Golden Gate Park, is surrounded by Stow Lake, an artificial, clay-lined reservoir. At a water-surface elevation of 267 ft., Stow Lake is 25-50 ft. higher than the Arboretum and other surrounding terrain. The holding pond is located near the summit of the Hill. The watercourse of the cataracts is built in an easterly direction from it to the upper and lower Huntington Falls spillways. These are located at the top of a 40% slope with a northeasterly aspect. The Reservoir, to the west of the lower spillway, is at an elevation of 361 ft. The proposed Pavilion site is a relatively flat area on the Lake shore to the south of the Lake inlet of the Falls; it is at the base of a 35% slope with an easterly aspect.

The bedrock underlying Golden Gate Park is largely covered by deep, fine- to medium-grained dune sand. Strawberry Hill, particularly the southern and eastern slopes, is one of the few areas where bedrock is exposed. The underlying rock is typical of the California Coast Range and been found to be of the Franciscan formation. Franciscan rocks consist of a mixture of dark-colored, muddy sediments, red, green and brown cherts, and lava flows of dark basalt. On Strawberry Hill, the rocks are primarily cherts (formed by deposits of silica, containing micro-organisms which were transformed into hard, porcelain-like rocks) and shale (associated with graywacke sandstones and greenstones). On the southern slope are also areas containing

### III. ENVIRONMENTAL SETTING

unconsolidated slope debris./1/ The berms surrounding the Lake on which Stow Lake Dr. is built are of an artificial fill composed primarily of dune sand, chert and clay./1/

The Pavilion site and the lower Falls watercourse on the easterly slope of Strawberry Hill are located on chert and shale bedrock. This rock has low permeability, except where fractured, and is slightly weathered. The holding pond, cataracts, Reservoir and rockwork of the upper and lower Falls are located in areas covered with dune sands./1/

The soils of Strawberry Hill, and Golden Gate Park generally, are of the Baywood Association. These are deep, rapidly permeable fine to medium-grained sands characterized by excessive drainage and a high susceptibility to wind erosion./2/

### SEISMICITY AND OTHER HAZARDS

There are no known active faults within the City and County of San Francisco; however, the site is subject to earthquakes because the City is in a seismically active region. Three major active fault zones are near the City. The San Andreas fault which has a northwesterly orientation is approximately four miles west of the project sites beneath the Pacific Ocean. The maximum predicted earthquake on this fault is 8.3 magnitude on the Richter scale (a logarithmic scale for expressing the magnitude of a seismic event in terms of energy dissipated); such an earthquake occurred in 1906 and resulted in the destruction of the Sweeney Observatory atop Strawberry Hill. An earthquake of that magnitude, as well as lesser tremors, might be expected to occur during the life of the proposed project. Earthquakes might also occur on the active Hayward fault which lies about 20 miles northeast of the site, and the Calaveras fault which passes about 30 miles northeast of the site./3/

Two other inactive faults, the City College fault and the San Bruno fault are located to the south of the site; they are not considered to pose a seismic hazard./3/



### III. ENVIRONMENTAL SETTING

The project site is not considered to be subject to liquefaction,/4/ subsidence,/5/ or inundation as a result of San Francisco Water Department reservoir failure./6/ Although Strawberry Hill is not in a designated landslide area,/6/ the age and weakness of the existing eight-inch iron irrigation piping and highly erodable soils pose a potential landslide hazard on the eastern slope above the Pavilion site should the pipe break and water flow out onto the slope./7/

#### FOOTNOTES - Geology, Soils and Seismicity

/1/ J. Schlocker, M.G. Bonilla, and D.H. Radbruch, Geology of the San Francisco North Quadrangle, Map I-272, U.S.G.S.

/2/ Kenneth Bernhardt, Department of Research and Planning, Recreation and Park Department, written communication dated 7 November 1977.

/3/ City and County of San Francisco, 1977, Final EIR EE 75.304, West Side Transport/Storage Project, pp. 65 and 66.

/4/ Liquefaction is earthquake-induced transformation of a stable granular material, such as sand, into a fluidlike state, similar to quicksand.

/5/ Subsidence is an uneven local settlement of the ground's surface.

/6/ City and County of San Francisco, 1974, Community Safety Element of the Comprehensive Plan.

/7/ Douglas Martin, Division Engineer, Recreation and Park Engineering, Department of Public Works, personal interview, 1 November 1977.

#### D. PLANTS AND WILDLIFE

Strawberry Hill is a chert-greenstone formation (see Geology setting, p. 16) covered in most areas by sandy soil with organic mulch added. This would provide a dry site for vegetation, unless irrigation or a shallow water table were provided. When Stow Lake was built, an artificial, shallow water table was created around lake shore; this allows a greater density of plants near the shore. These plants include willow, elm, and palm trees, coastal redwood, blackberry, iris and vinca. The plants on the eastern shore of Stow Lake have the advantage of protection from the coastal breezes.

### III. ENVIRONMENTAL SETTING

At an increased distance from the shore of the Lake, the vegetation on Strawberry Hill becomes sparse and tends to be drought-adapted species such as pine, cypress, eucalyptus, Australian tea tree and Christmas berry. Wildlife on the Hill includes a variety of songbirds, gophers, mice, squirrels and an occasional hawk or owl.

The Lake itself is the habitat of a variety of herbs, rushes and reeds near the shore and phytoplankton on its surface. Zooplankton, rotifers, mosquito fish, coots, ducks and turtles live in the Lake waters.

#### E. TRANSPORTATION-RELATED ASPECTS

Stow Lake Dr. encircles Stow Lake, connecting to John F. Kennedy Dr. to the north and to South Dr. to the south. It is a one-way street; traffic flows clockwise around the Lake. No traffic counts are available for Stow Lake Dr. On late fall and winter weekends, and on weekdays throughout the year, traffic is light. Parking spaces during these periods are available on either side of the Drive.

Weekends during the spring and summer present a different situation. On Sundays, the connection from Stow Lake Dr. to John F. Kennedy Dr. is chained to prohibit traffic from Stow Lake Dr. to John F. Kennedy Dr. Vehicles enter and exit at South Dr. On Saturdays, this connection is not chained, allowing traffic through. On warm days many people visit Stow Lake to bicycle, jog, stroll, skate board and roller skate. The Stow Lake Boat House rents boats and has a snack bar which attracts visitors. Parking on Stow Lake Dr. is usually difficult to find, causing vehicles to circle on Stow Lake Dr. to find a vacant parking place. Tour buses cannot use Stow Lake Dr. because of the sharp curves, but tour vans are able to negotiate the turns. Pedestrian access from the Japanese Tea Garden, John F. Kennedy Dr. and South Dr. is steep and paths are not well developed. Street parking on South Dr., John F. Kennedy Dr. and near the Japanese Tea Gardens provides very limited additional parking opportunity.

### III. ENVIRONMENTAL SETTING

The major attractions in the Park at present are the Japanese Tea Garden, California Academy of Science, Music concourse and the de Young and Asian Art Museums. These are on Tea Garden Dr. immediately east from Stow Lake Dr. off South Dr. Traffic on Tea Garden Dr. is between 5,000 and 20,000 vehicles per day./1/ Congestion occurs at the intersection of Tea Garden Dr. and south Dr. on weekends, being particularly noticeable on Sunday, when Tea Garden Dr. is chained to prohibit access.

#### FOOTNOTE - Transportation-Related Aspects

/1/ Harvey Quan, S.F. Traffic Department, telephone communication, 27 March 1978.

#### F. ENERGY

Stow Lake is filled to its 15 million gallon capacity with water from three sources: 1) the Arboretum water works wells (at 250 ft.); 2) the McQueen Water Reclamation Plant (at 175 ft.); and 3) the South Windmill well (at 25 ft.). Each source pumps a portion of the total lake intake and also fills the 750,000-gallon Strawberry Hill Reservoir. The quantity of water from each source has varied from year to year; during the 1975 to 1977 water shortage, the Reclamation Plant supplied most of the total.

Filling of Stow Lake or Strawberry Reservoir does not generally occur during irrigation of both ends of the Park, due to low water pressure in the water supply lines. Irrigation usually occurs on weekdays between April and November. Water can be pumped directly into either Stow Lake (at 267 ft.) or Strawberry Reservoir (at 361 ft.). Water pumped up to Strawberry Reservoir in excess of its capacity overflows down a pipe to Stow Lake using energy without accomplishing any purpose. This extra pumping could be avoided by directing flow into Stow Lake when the reservoir is full.

Energy is used to pump water to fill Stow Lake from sources at lower elevations; the lower the water supply source the more electrical energy is required. Energy used in pumping depends on the quantity of water pumped and

### III. ENVIRONMENTAL SETTING

the differences in elevation. Approximately three British thermal units (Btu) - a standard unit for measuring heat - of nonrenewable energy resource must be used to generate the electricity required to lift one gallon of water up to Strawberry Reservoir from the level of Stow Lake (approximately 94 ft.).

#### IV. ENVIRONMENTAL IMPACTS

#### IV. ENVIRONMENTAL IMPACTS

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##### A. LAND USE

##### CHINESE PAVILION

The Chinese Pavilion would add to the number and acreage of structures in the Park. There are in excess of 28 acres of buildings, excluding nursery and restroom structures now present. It would be placed on Strawberry Hill island, on the side of Stow Lake where there are no existing structures. It would be located about 1,300 ft. from a concentration of existing buildings and would be in the area of Park which now has an Oriental theme, including the Asian Art Museum and the Japanese Tea Garden. The footpath in the vicinity of the Pavilion would be interrupted by the placement of the structure, but it would be re-established behind the Pavilion as the site is a flat, wide area, so no disruption of pedestrian traffic would result after completion of construction.

The Pavilion would be expected to draw additional visitors to the Park particularly immediately after its construction. It would attract Park visitors to Stow Lake and would generate increased use of the Strawberry Hill shoreline footpath by people wishing to view or use the Pavilion.



#### IV. ENVIRONMENTAL IMPACTS

##### RESTORATION OF HUNTINGTON FALLS AND REHABILITATION OF THE IRRIGATION SYSTEM

Replacement of the existing eight-inch irrigation pipe and rehabilitation of the Reservoir would not alter the land use of the area. The restoration of Huntington Falls would return the holding pond, cataracts, and Falls to the condition and use they enjoyed from the 1890's to 1962. The existing pedestrian path at the eastern end of the Reservoir (above proposed Falls) would be removed by the Falls' restoration but use of the path would continue via the proposed pedestrian bridge. The dirt path along the Lake (at the bottom of the proposed Falls) would be removed during the proposed dredging of the inlet and would be replaced by a series of stepping stones, similar to those in use in the Japanese Tea Garden. The damming and draining of a portion of the eastern end of the Lake during construction would inhibit or stop boating activities for that period.

Except during the construction period, the replacement of piping and the rehabilitation of the Reservoir would have no impact on visitor use of the Park or Stow Lake. The restored Falls would attract visitors to the Park in the initial period after construction, and would be expected to cause a small increase in overall Park attendance. Increased visitation would be expected at Stow Lake to view the Falls. Pedestrian traffic on Strawberry Hill would increase, as people would wish to come close to the Falls; there would be more visitors to the summit of the Hill to view the cataract, which would not be clearly visible from the Lake's perimeter. The flow of up to 1,800 gallons of water per minute into the Lake from the Falls might make boating near the inlet more difficult, but space on either side of the small, northeastern island would permit navigation in that area of the Lake (see Figure 2, p. 5).

## IV. ENVIRONMENTAL IMPACTS

### B. VISUAL AND AESTHETICS

#### CONSTRUCTION PERIOD

The Stow Lake area would be disturbed during the construction period for both projects; the sites would be closed to pedestrians and construction equipment would be visible and audible. Construction of the Pavilion would require some grading and the removal of some vegetation.

Restoration of the Falls and rehabilitation of the Reservoir would require the closing of the unpaved path at the spillway and as it approaches the summit of the Hill. A 20-foot-wide section of the Lake would have to be drained to replace the irrigation piping; this would reduce its aesthetic and recreational value during the period of construction.

#### CHINESE PAVILION

The proposed Chinese Pavilion would be located in the section of the Park which currently has an Oriental theme and would be accessible from the Japanese Garden or Music Concourse by the path and steps at the northeastern corner of the Lake. There are no buildings currently located in the east Stow Lake area. No buildings would be visible from the Pavilion. The view from the Pavilion would extend from the northeastern arm of the Lake, which contains a small island, to the southeastern portion of the Lake; the movement of cars and pedestrians along eastern Stow Lake Dr. could be seen across the water. A short distance along the unpaved footpath would be viewed to the north and south; the hillside and two of the mature palm trees would rise behind the Pavilion to the west. Sunlight would fall on the building for most of the day and it would be sheltered from the ocean winds.

The Chinese Pavilion would be an octagonal structure about 27 ft. in width and 28 ft. high, including a spire of 4.5 ft. (see Figure 5). Stairways would provide entrance from the pathway on the south and north faces to the interior floor which would be 2.5 ft. above ground level. A low balustrade would back the benches encircling the interior. The easterly side would extend just over the water. The grey-green tile roof would minimize the





Size and position of Pavilion are approximate.

FIGURE 5 RENDERING OF CHINESE  
PAVILION ON THE SITE



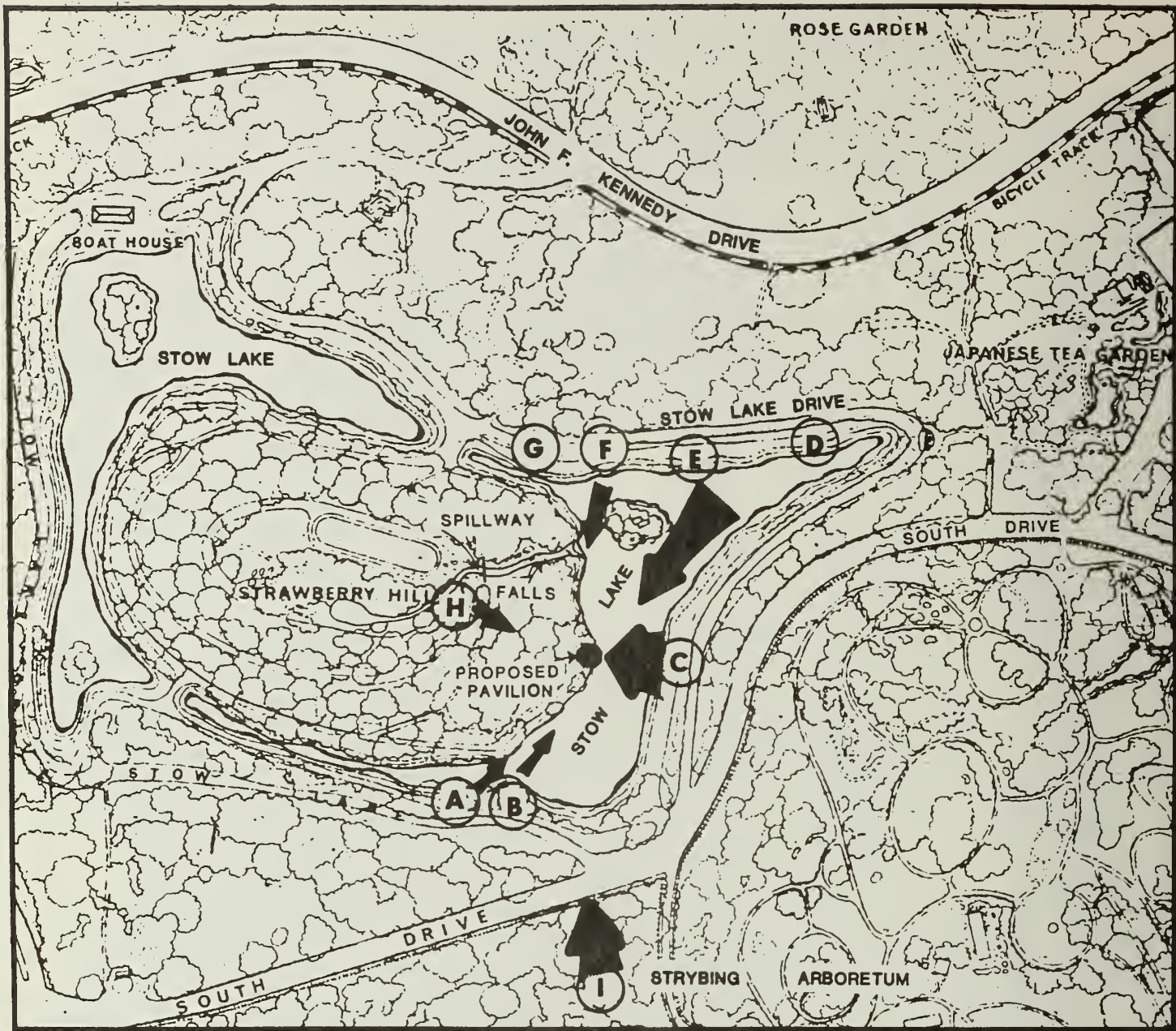
#### IV. ENVIRONMENTAL IMPACTS

points from which the Pavilion would be seen from the trail on the Hill above (H on Figure 6). The red columns would attract the attention of pedestrians and drivers on eastern Stow Lake Dr. as the Pavilion would be alternately revealed and hidden by the foliage along the Lake's perimeter.

The site has a variety of colors and types of plant materials including the dark green pines and irises, the medium-green willows and palms, the blue green cedars to the north, the white pampas grass, and yellow elms (in the fall), which would provide a diverse backdrop for the red columns and neutral wooden trim of the Pavilion. Although the height of the palm trees would bring the structure into scale, the palms are not plants characteristic of Chinese gardens, nor are most of the other types of vegetation on the site.

A pedestrian walking east along the path on the southern perimeter of the Lake would first glimpse the spire of the Pavilion at (A) see (Figure 6). The Pavilion would then be masked by willow and cypress trees growing on the island shore and by vegetation on the Lake's perimeter until the roof of the structure could again be seen at the bench at (B). The Pavilion would be partially visible through trees and shrubs until it could be seen in its entirety in the shoreline area of (C). Here the Pavilion could be viewed most closely across the Lake. At the end of the Lake arm (D) the Pavilion would appear across an expanse of water, framed by trees on both Lake shores. The Pavilion would remain visible, when not masked by vegetation near the path, until obscured by the small island at (E). On the north side of the Lake, emerging from behind the small island, the structure would be partially revealed through the foliage; it would last be seen at (F).

Approaching the site from the south on the Strawberry Hill footpath, the upper part of the Pavilion would first be visible near the junction with the trail descending from the Reservoir on the southeastern side of the Hill; from the north the bright red of the columns would catch the eye after the viewer emerged from the relative darkness of the redwood grove.



Refer to the text for discussion.

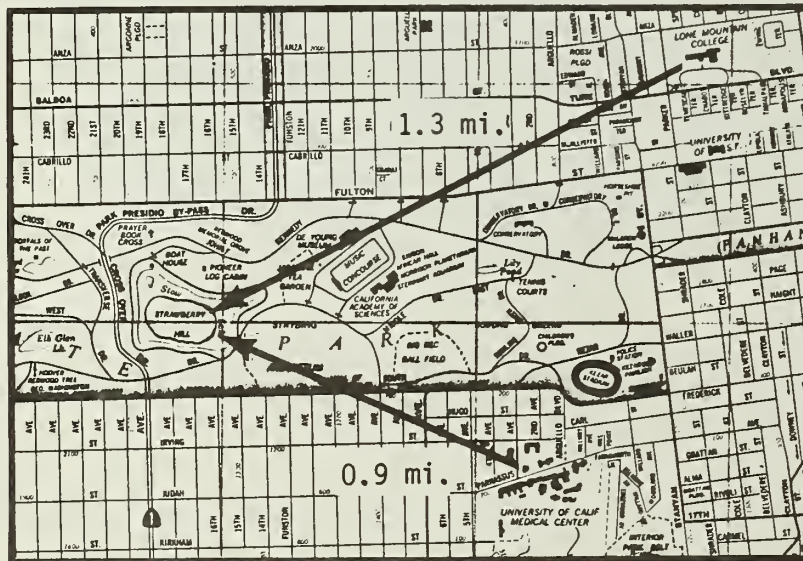


FIGURE 6 VIEWS OF THE CHINESE PAVILION IN GOLDEN GATE PARK



#### IV. ENVIRONMENTAL IMPACTS

The Pavilion, because of its location at the foot of the Hill, would only be visible from Stow Lake Dr., Strawberry Hill and the grassy hills to the south in Strybing Arboretum (I on Figure 6, p. 27). The Pavilion would be visible from approximately 1% of the total area of the Park./1/

#### HUNTINGTON FALLS AND IRRIGATION SYSTEM

The restored Falls would be visible for distances as far as Lone Mountain College to the east and UC Medical Center to the southeast due to its elevation on the side of Strawberry Hill (see Figure 6, p. 27). The flowing water would cover the currently bare ruined spillway of the lower falls, and the sand and debris would be removed from the eroded watercourse and inlet in the Lake. Replanting of the area, aided by the added moisture from the spray, would help restore the understory vegetation in the areas adjoining the watercourse. The sounds of the falling water would mask existing traffic and other noises.

The path which now exists between the upper and lower falls would be covered with flowing water and would be replaced by a pedestrian overlook bridge; a sweeping view of the City to the east and southeast could be seen from the bridge.

Although the water in the cataracts flowing from the holding pond would not be clearly seen from the perimeter of the Lake, it would provide visual and auditory interest to the pedestrian climbing to the Hill's summit. A pedestrian walking east along the southern perimeter of the Lake would be able to hear the Falls before they could be seen. The top of the spillway could be glimpsed first at (C) and the Falls would remain in view, when not obscured by foliage along the Lake's perimeter, until they could last be seen at (G) (refer to Figure 6, p. 27 for the locations of these points). Because of its elevation, the spillway is more visible than the Pavilion site and is only partially obscured by the pines on the south side of the small island.

The replacement of the irrigation main and the rehabilitation of the Reservoir would not alter the visual character of the area except during the construction phase.

#### IV. ENVIRONMENTAL IMPACTS

##### FOOTNOTE - Visual and Aesthetics

/1/ Calculations are available at the Office of Environmental Review.

#### C. GEOLOGY, SOILS AND SEISMICITY

##### GEOLOGY AND SOILS

If the existing irrigation pipeline laid in the 1890's were not replaced, a failure could cause landsliding on the eastern slope of Strawberry Hill, presenting a hazard to the existing plantings and shore, and to the proposed Pavilion./1/ Because of the flatness of the site and the minimal soil movement required for construction, the Pavilion would not be expected to affect the geomorphic features or soils of the area.

Trenching for the laying of the irrigation pipeline would result in erosion, as the work would be done during the rainy season. The work is to be done at this time because the Reservoir irrigation supply would be least needed in the Park./1/

The existing eroded condition of the shore of Strawberry Hill would be repaired during the reconstruction of the Falls. This reinforcement would counteract the additional eroding effect on the shoreline of the agitation of the waters of the Lake by the Falls. The replanting of the area around the Falls would also help to decrease soil erosion taking place there.

##### SEISMICITY

The project sites would be subject to "very strong" ground shaking/2/ during an earthquake of 8.3 magnitude (Richter scale) on the San Andreas fault. Other hazards would include landsliding and cracking. Very strong ground shaking might cause damage to the foundation and masonry of the Pavilion, but, as it would be built on bedrock, the building would probably not collapse. Unrestrained objects and building ornamentation might fall. Ground shaking might also cause cracking of the concrete-lined reservoir, damage to the stonework of Huntington Falls, and rupturing of irrigation water pipes. It

#### IV. ENVIRONMENTAL IMPACTS

should be noted that the irrigation piping system and Huntington Falls were not damaged in the earthquake of 1906, but should the irrigation piping break or the Reservoir rupture, the resulting rush of water could cause landsliding on the Hill slopes.

Because there are no natural gas lines or electrical lines on Strawberry Hill, the danger of earthquake-induced fire caused at the site would be slight. Fire could spread to the area should a conflagration begin in another section of the Park.

The number of people who might be affected by an earthquake catastrophe would probably not be increased by the projects, as visitor use of the sites would be intermittent and there would be no permanent employees or residents.

#### FOOTNOTES - Geology, Soils and Seismicity

/1/ Douglas Martin, Division Engineer, Recreation and Park Engineer, Department of Public Works, personal interview, 1 November 1977.

/2/ City and County of San Francisco, 1974, Community Safety Element of the Comprehensive Plan, p. 8.

#### D. PLANTS AND WILDLIFE

The pipeline repair would affect a strip 10 to 20 ft. wide extending southeast from the Strawberry Hill Reservoir to the intersection of Stow Lake and South Dr. (see Figure 2, p. 5). Short-term impacts would include:

- 1) Displacement of phytoplankton, zooplankton and mosquito fish from the drained portion of the Lake. If the Lake were to be completely drained, all waterlife would be killed and the waterfowl using the Lake would be displaced. Migrating waterfowl would be most affected if the Lake were drained during winter.

#### IV. ENVIRONMENTAL IMPACTS

- 2) The shoreline plants requiring the greatest amount of water, such as rushes and water plants, would be killed and the iris, willow, elm and other plants would suffer decline along that portion of the Lake which is drained.
- 3) The pipeline trenching would displace plants and root networks along the distance of the pipeline. This would be most noticeable in the dense vegetation on the flat near the shore.

No long-term impacts would be expected; it is likely that the Lake and shore would recover after three years. If trenching were to remove mature trees with trunks six inches or more in diameter, it would take 20 to 50 years for such trees to be replaced.

Construction of the Chinese Pavilion would displace ground cover, shrubs and trees on the shore of Strawberry Hill. Trees removed would include an elm and a section of the shoreline willow. The extent of the grading would determine the length of willow removed. It would not need to be more than 30 ft. The palms and Queensland-pine would not be disturbed during construction.

After completion of the Pavilion, increased visitor use of the footpath might discourage some wildlife from using this area, and pedestrian travel off the footpath might damage understory vegetation.

The restoration of Huntington Falls at its original location would not disturb the grove of coastal redwood, deador cedar, or other ornamental trees. The restoration would displace a limited amount of English ivy, sophora, iris, dock, rush and elm shrub. It is possible that feral cats, rats and mice have used the old blocks of concrete remaining from the earlier Falls for shelter; this use would be disrupted during construction.

The mist from the waterfall would provide some additional water to slope plants and enable Park horticulturalists to plant a greater number of species, including ferns, near it.



#### IV. ENVIRONMENTAL IMPACTS

Any irrigation system installed on Strawberry Hill as part of this project would allow more species to be planted on the Hill slopes where drought conditions presently exist. This would encourage greater plant diversity on the Hill and more use of the area by songbirds, cottontail rabbits and squirrels than at present.

#### E. TRANSPORTATION-RELATED ASPECTS

The Pavilion and the restored Huntington Falls would be two more attractions in this heavily visited area of the Park. It can be expected that traffic and parking demand would increase on Stow Lake Dr. Pedestrians and bicyclists would also increase. This would tend to increase congestion and demand for parking during spring and summer weekends on Stow Lake Dr. and South Dr. because the two additional attractions would draw more visitors and would extend the visit of a number of present visitors. Stow Lake Dr. is not accessible to tour buses; Stow Lake Dr. and possibly South Dr. would need to be widened or straightened and parking prohibited in order to accommodate buses. There are no existing plans to allow buses on Stow Lake Dr. and plans are under consideration to decrease all vehicle traffic in the Park.

The area is accessible by foot up steep steps to Stow Lake Dr. from Tea Garden Dr., South Dr. and John F. Kennedy Dr. The 50-ft. elevation of Stow Lake above the surrounding areas might limit the number of tourists, especially senior citizens, who would walk up to see the Pavilion and Falls if tour buses were to stop and park on South Dr., John F. Kennedy Dr. or use their existing stop near the Japanese Tea Garden.

The degree of visitor use would depend, in part, on the scheduling for operation of Huntington Falls by the Recreation and Park Department, and whether the people were assured of seeing water flowing over it. The Recreation and Park Department estimates that the Falls would run 40 hours per week. Operation of the Falls may be expected to attract visitors and increase traffic and parking demands. If the schedule is dependable and publicized, visitation to the Falls would be greatest during the 40 hours of operation.

#### IV. ENVIRONMENTAL IMPACTS

During construction of the Falls, up to 1,000 cubic yards of dredged materials not suitable for embankment would be trucked (approximately 50 trucks) to the vicinity of the Zoo. Trucks would be expected to travel via South Dr., 19th Ave. and Sloat Blvd.

##### F. ENERGY

The total amount of energy used by the proposed cataracts and waterfall would depend on two factors that are presently undetermined: 1) the period each day (or week) that the waterfall could be expected to be in operation; and 2) the volume of water expected to flow over the waterfall after its completion. Eighteen hundred gallons per minute was estimated by the Recreation and Park Department to be the flow necessary for operation of the Falls. The Recreation and Park Department estimates that the Fall would operate 40 hours per week./1/

Water from Strawberry Reservoir would be pumped up about 50 ft. from the Reservoir to the holding pond; this would require 1.5 BTU of nonrenewable energy resource for each gallon of water pumped./2/ Then the water would flow down the cataracts and over the waterfall to Stow Lake. The energy expenditure to operate the cataract and waterfall would be in addition to that needed to operate the Park irrigation system. Approximately 518,000 BTU (at source) of nonrenewable resource energy per hour would be used to lift the projected flow of 1,800 gallons per minute up the nearly 150 ft. from Stow Lake to the holding pond./2/ Assuming 40 hours of operation per week, the annual nonrenewable energy resource expended for the Falls would be approximately 1,080 million BTU (at source).

Energy would also be used for construction of the Falls and Pavilion, by the vehicles used to visit the site, and for pumping water to replace that which would evaporate from running over the waterfall.

##### FOOTNOTES - Energy

/1/ Tom Malloy, Recreation and Park Department.

#### IV. ENVIRONMENTAL IMPACTS

/2/ The calculation of energy to lift 1,800 gallons of water up 150 ft. was made by Environmental Science Associates and is available for public review at the Office of Environmental Review, Department of City Planning.

##### G. PUBLIC ATTITUDES

During preparation of this environmental impact report, several individuals and organizations who had expressed an interest in commenting on the proposed project were contacted and letters and statements concerning the project were reviewed.

No opposition to the restoration of Huntington Falls or to the associated work on the irrigation system was encountered. Opinions differed on construction of the proposed Chinese Pavilion.

In support of the Pavilion the following positions were held:

- The Pavilion would add to the enjoyment of the citizens of the Richmond District and of all San Francisco and would enhance Golden Gate Park./1/
- Although it contains diverse cultural tributes, Golden Gate Park presently has nothing related to the culture of China; the Pavilion is particularly important due to the sensitivity of the issue of the "two Chinas"./2/
- There would be no direct costs to the City of San Francisco connected with construction of the Pavilion./3/
- Acceptance of the Pavilion would be a gesture of friendship between the citizens of Taipei and San Francisco./4/

Opposition to the construction of the Pavilion was based on the following concerns:

- The Pavilion should not be placed in Golden Gate Park because it would reduce the amount of open space; no new construction should occur in the Park./5/

#### IV. ENVIRONMENTAL IMPACTS

- San Francisco has six Sister Cities; if a structure for Golden Gate Park were to be accepted from one, the City would then be obligated to accept other structures from other Sister Cities./5/
- The Pavilion was linked to the popular Huntington Falls restoration "as a political ploy to push approval of the Pavilion through."/6/
- The Pavilion would require additional services and create increased vehicular traffic in the Stow Lake area./7/

Additional comments and concerns which may be expressed as a result of public and public agency review of the Draft EIR and the responses to such comments will be incorporated into the Final EIR.

#### FOOTNOTES - Public Attitudes

/1/ Ben L. Hom, President, New Chinatown Improvement Association, telephone communication, 9 February 1978.

/2/ Mrs. George N. Crocker, Member San Francisco-Taipei Sister Cities Committee, letter dated 6 October 1976.

/3/ Gregory Hurst, Manager, Economic Development Department, The Greater San Francisco Chamber of Commerce, letter dated 4 November 1976.

/4/ Lim P. Lee, Co-chairman, San Francisco-Taipei Sister Cities Committee, personal interview, 8 November 1977.

/5/ Raymond H. Clary, Historian, John McLaren Society, telephone communication, 1 December 1977.

/6/ Jeanne Lippay, Chairperson, Task Force on Golden Gate Park, telephone communication, 1 December 1977.

/7/ Richard Hansen, President, Preservation Hall Democratic Club, letter dated 9 November 1976.



## V. MITIGATION MEASURES

### V. MITIGATION MEASURES

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All of the following mitigation measures have been agreed to by the San Francisco Recreation and Park Department./1/

#### LAND USE

- Remove a minimum of plants near the Pavilion so that the new structure would be less obtrusive.
- During damming and draining maintain boat passage across eastern Stow Lake during construction to reduce disruption of boating activities.

#### VISUAL AND AESTHETICS

##### CHINESE PAVILION

- The proposed color of the glazed tile roof has been changed from yellow to a grey-green similar to the color of the roof of the Chinatown Gate. This was a condition of the Phase II approval of the project granted by the San Francisco Art Commission so that the project would blend with the foliage.

## V. MITIGATION MEASURES

- Approval of actual samples of roof tile, flooring, and the shade of red to be used for the columns would be required for Phase III approval of the project by the San Francisco Art Commission. A muted red would be preferred for the columns by the Commission./2/
- Remove a minimum of vegetation at the site. Retention of the elm tree immediately south of the Pavilion and of the irises at its base would soften the visual impact of the structure.
- Use traditional Chinese garden plant materials for additional landscaping to complement the Pavilion.

## HUNTINGTON FALLS AND IRRIGATION SYSTEM

- Landscape the lower Falls area to repair damage caused during construction and to give the Fall an established and integrated appearance.

## CONSTRUCTION PERIOD

- Repair damage to the Strawberry Hill footpath caused by the movement of construction machinery and restore it to its original condition.
- Do the most visible construction work concurrently. This would be constructing the Pavilion, dredging the inlet, repairing the lower falls, and replacing the irrigation pipeline. This would minimize the period of time in which recreational enjoyment of Stow Lake and Strawberry Hill would be impaired.
- Drain a minimum amount (approximately a 20-foot-wide strip) of the Lake, using coffer dams, for the pipe replacement. This would avoid draining the entire Lake, thus minimizing damage to fish populations and maintaining water storage volume for irrigation.

## V. MITIGATION MEASURES

### GEOLOGY, SOILS AND SEISMICITY

- In order to decrease rain and wind erosion, retain to hold the soil all plantings which it would not be necessary to remove for construction activities, especially along the shoreline.
- Replant the pipeline route and the Huntington Falls area immediately after the completion of construction to minimize the length of time the soil would be exposed.
- Reinforce the shoreline to slow erosion caused by the water from the Falls.
- Firmly anchor all ornamental wooden trim, roof tiles, and plaques to the Pavilion.

### PLANTS AND WILDLIFE

- Use the minimum width necessary for pipeline trenching and construction on shore and through the Lake to decrease the ecological impact of the project on plant and fish populations.
- Align the pipeline and dredge the inlet to avoid removal or damage to the roots of mature trees.
- Border the path leading to the Pavilion from both directions with a small fence, boulders, or a shrubby hedge to prevent pedestrians from going up the Hill or through the plantings. This measure would reduce mutilation of plants and disruption of the soil.
- Encourage mist from the waterfall in the design of the Falls; this would help irrigate a rich flora near the Falls. Design would, however, avoid water splash which would cause erosion.

## V. MITIGATION MEASURES

- Create a flat, marshy mouth at the Falls outfall into the Lake to encourage a fresh water marsh vegetation that would add new wildlife habitat in the Park.

## TRANSPORTATION-RELATED ASPECTS

- Engineer the construction of the Falls to enable flexible scheduling; one way to accomplish this is by recirculating Stow Lake water through the Falls by a system of pipes, valves and pumps separately operated from the irrigation system and requirements of the Park. This would permit visitor-level management and publicity of the Falls by the Recreation and Park Department to assist in maximizing visitor benefits or minimizing traffic.
- Study the feasibility of reducing visitor use of private vehicles on Stow Lake Drive by offering a shuttle bus from the Japanese Tea Garden around Stow Lake Drive and back, or by restricting traffic from Stow Lake Drive on weekends./3/ The second option might decrease business at the Boat House and decrease visitor levels.
- Control parking along Stow Lake Drive to preserve road-side grass and vegetation from vehicles; this could be done with curbs or large rocks.

## ENERGY

- Reduce non-renewable energy used to operate Huntington Falls by
  - 1) installing a waterfall system that has maximum flexibility for scheduling and independence from the irrigation scheduling and system, and
  - 2) designing the waterfall for minimum water flow necessary to achieve visual and aesthetic requirements. The first requirement would be met by installing a recirculation system that uses a pump (such as the pump in the Boat House) to lift water from Stow Lake to the Holding Pond at the top of Strawberry Hill. This system would not be used to regulate the level of Stow Lake since a direct flow into the Lake from the windmill



## V. MITIGATION MEASURES

wells and McLaren Water Reclamation Plant would keep it filled. This mitigation would make energy spent lifting water for the Falls directly controllable for visitor benefit. It would allow the irrigation and Falls system to run simultaneously, and not require lifting water from the lower elevations of the Reclamation Plant or wells to run the Falls. The water for the Falls would be lifted 150 ft.

### FOOTNOTES - Mitigation Measures

/1/ T. Malloy, Recreation and Park Department, letter to Gerald K. Owyang, Office of Environmental Review, Department of City Planning, 30 January 1979.

/2/ P. Carlyle, Commissioner, San Francisco Art Commission, telephone communication, 3 November 1977.

/3/ T. Lillyquist, Recreation and Park Department, telephone communication, 7 March 1979.

## VI. SIGNIFICANT ENVIRONMENTAL EFFECTS

### VI. SIGNIFICANT ENVIRONMENTAL EFFECTS WHICH CANNOT BE AVOIDED

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#### ADVERSE ENVIRONMENTAL EFFECTS

##### LAND USE

Access to portions of Strawberry Hill and Stow Lake would be restricted during construction of the projects.

##### VISUAL AND AESTHETICS

Construction activities would result in temporary effects on the visual and aesthetic character of the Stow Lake area and noise levels would increase in the Stow Lake area during construction, detracting from the natural, quiet character of the area.

##### PUBLIC ATTITUDES

Some or all of the public may perceive either or both of these projects as adverse to the character, nature, or intent of the Stow Lake area or of Golden Gate Park.

## VI. SIGNIFICANT ENVIRONMENTAL EFFECTS

### PLANTS AND WILDLIFE

Construction of the proposed project would temporarily eliminate landscape plantings and wildlife habitat, and affect the circulation and aquatic biota of the Lake.

### TRANSPORTATION-RELATED ASPECTS

Any additional transportation demands due to increases in visitor use of the area would aggravate existing peak-hour traffic problems near Stow Lake.

### ENERGY

Energy would be consumed in constructing components of both projects and in pumping water to operate the reconstructed Huntington Falls.

## VII. ALTERNATIVES

### VII. ALTERNATIVES

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#### A. NO PROJECT

Under the no project alternative, no action would be taken to erect the Chinese Pavilion, restore Huntington Falls, dredge the inlet and stabilize the eastern shore of Strawberry Hill, or improve the irrigation system.

If the Pavilion were not built, the eastern section of Stow Lake and Strawberry Hill would remain as is, with no structures. The Pavilion could be erected elsewhere or stored for future use. If the Falls were not restored, the ruins of the old spillway would continue to be visible; planting would remain as is, with no new plant species encouraged by spray from the Falls. No additional energy would be used for pumping water, construction or dredging. The inlet would remain filled with sand from the collapsed Falls and erosion of the eastern shore of Strawberry Hill would continue. If the eight-inch diameter irrigation main were not replaced, irrigation of the eastern section of the Park would not be temporarily disrupted nor would boating activities be limited by damming a portion of the Lake. There would be a danger that the old pipe could give way, washing away soil on the eastern side of Strawberry Hill, presenting a hazard to pedestrians, and either forcing immediate repair of the line or halting irrigation of the eastern section of the Park.



## VII. ALTERNATIVES

As no construction would occur to prevent pedestrian use of Strawberry Hill and no new visitor attractions would be provided, visitor use and traffic in the Stow Lake area would be unaffected.

### B. RECONSTRUCTION OF THE FALLS WITHOUT THE CHINESE PAVILION

If the Chinese Pavilion were not built, no increase in visitor use or traffic attributable to it would occur. The eastern end of Stow Lake would continue to afford views without buildings. Construction impacts attributable to the Pavilion would not occur.

Restoration of Huntington Falls and completion of the related dredging and improvements to the irrigation system would have the impacts discussed in the text. Disruption of the area during construction and added energy consumption would occur. There would be increased visitor use and traffic which would be dependent on the schedule for operation of the Falls.

### C. PHASED PROJECT

If the Falls restoration and related work were completed in one phase and the Pavilion erected at a later date, the impacts of the project would remain substantially the same. However, pedestrian access to eastern Strawberry Hill and the aesthetic enjoyment of Stow Lake visitors would be impaired during two periods of construction. Costs of installation paid by Taiwan would increase for each year of delay.

### D. ERECTION OF THE CHINESE PAVILION WITHOUT RESTORATION OF HUNTINGTON FALLS

The impacts of the Chinese Pavilion described in the body of the report would remain unchanged. The effects of not restoring the Falls or dredging the inlet and not making the improvements to the irrigation system would be as discussed in the second paragraph under No Project.

## VII. ALTERNATIVES

### ALTERNATIVE PAVILION SITES

Site selection within the Park is discussed in Project Description, Chinese Pavilion, p. 3. Alternative sites outside the Park are excluded by the conditions of the gift.

VIII. SHORT-TERM VS LONG-TERM

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Construction of the proposed projects would result in short-term impacts. Operation of the reconstructed Huntington Falls would require the continuing commitment of energy resources. The major long-term implications of the projects would be the value of the projects as amenities in Golden Gate Park, an increase of visitation to Stow Lake, the accompanying traffic increases, and the views of the Pavilion and Falls from Strybing Arboretum, Lone Mountain College and the U.C. Medical Center, respectively.

## IX. IRREVERSIBLE ENVIRONMENTAL CHANGES

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Non-renewable energy and material resources would be consumed in the erection of the Pavilion and in the reconstruction and operation of Huntington Falls, should the projects be implemented. Materials used in the construction of either project could not be recycled or reused, and therefore would be irrevocably committed to the proposed use.



X. REPORT PREPARATION

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